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ABSTRACT

This document, which is intended for technology educators in Mississippi, outlines a technology discovery course in which a modular instruction approach allows ninth graders to experience various workplace technologies within four career cluster areas: agriculture/natural resources technology, business/marketing technology, health/human services technology, and engineering/industrial technology. Presented first are a course description, list of course goals, and course outline. The remainder of the guide is divided into two sections. Section I, which is the actual curriculum framework, lists suggested behavioral objectives to enable students to master the 30 competencies addressed in the course. Section II consists of outlines for 16 units on the following topics: course overview; introduction to technology; aerospace, audio/video communications, biomedical, computer-aided design and drafting, computer imaging, electrical, engineering structures, environmental, laser, manufacturing management, production/processing, robotics, satellite communications technologies, and emerging technologies. Each unit outline contains suggested time on tasks, competencies and objectives, teaching strategies, assessment strategies, and resources. A student competency profile is appended. (MN)

ED 397 312

Mississippi Curriculum Framework for Technology Discovery

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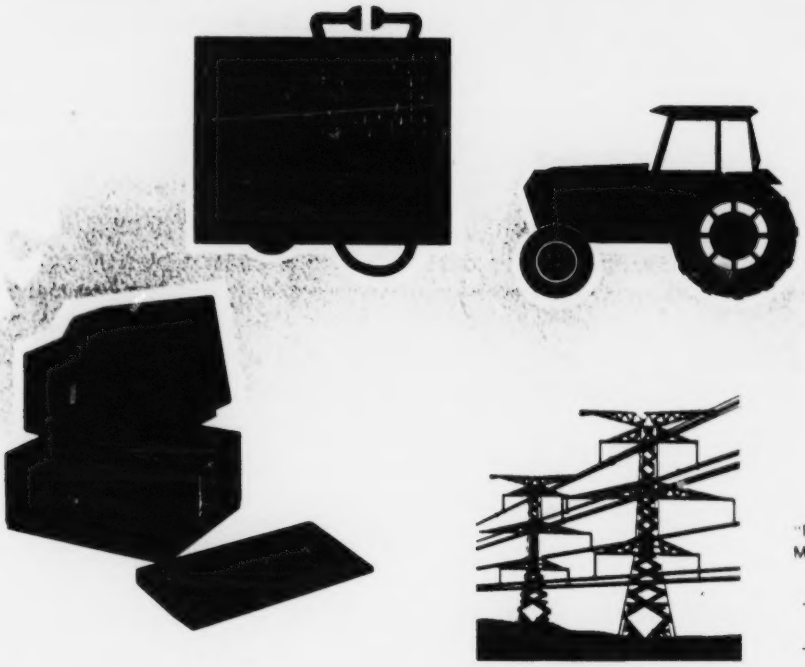

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CURRICULUM FRAMEWORK

FOR

TECHNOLOGY DISCOVERY

(9th Grade)

CIP: 00.0253

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TECHNOLOGY DISCOVERY

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TABLE OF CONTENTS

REVIEW TEAM MEMBERS iii

COURSE DESCRIPTION 1

COURSE GOALS 1

COURSE OUTLINE 3

SECTION I: CURRICULUM FRAMEWORK (COMPETENCIES AND SUGGESTED OBJECTIVES) 5

SECTION II: CURRICULUM FOR TECHNOLOGY DISCOVERY 13

Unit 1: Overview of Technology Discovery Course 15
Unit 2: Introduction to Technology 17
Unit 3: Aerospace Technology 20
Unit 4: Audio/Video Communications Technology 22
Unit 5: Biomedical Technology 24
Unit 6: Computer Aided Design and Drafting Technology 26
Unit 7: Computer Imaging Technology 28
Unit 8: Electrical Technology 30
Unit 9: Engineering Structures Technology 32
Unit 10: Environmental Technology 34
Unit 11: Laser Technology 36
Unit 12: Manufacturing Management Technology 38
Unit 13: Production/Processing Technology 40
Unit 14: Robotics Technology 42
Unit 15: Satellite Communications Technology 44
Unit 16: Emerging Technologies 46

APPENDIX A: STUDENT COMPETENCY PROFILE 49

COURSE DESCRIPTION
TECHNOLOGY DISCOVERY

Technology Discovery uses the modular instruction approach to allow students to experience different workplace technologies. Working in two-person teams, students rotate through a series of thirteen self-contained instructional modules. In each module, the students apply communications skills, explore operating principles, mathematical and scientific concepts, and the universal systems concept as related to the selected technology. The students also identify applications of that technology in the four occupational cluster areas of the Tech Prep initiative (Agriculture/Natural Resources Technology, Business/Marketing Technology, Health/Human Services Technology, and Engineering/Industrial Technology). Students conduct hands-on activities in each module which demonstrate practical applications of the technology. Students also have the opportunity to explore emerging technologies and conduct research through the use of an Emerging Technology Research Center.

COURSE GOALS

1. Identify technological resources and apply them within the four career cluster areas of Agriculture/Natural Resources Technology, Business/Marketing Technology, Health/Human Services Technology, and Engineering/Industrial Technology.

2. Experience and utilize selected technological processes found within the four career cluster areas.

3. Utilize technological systems to solve problems.

4. Apply and transfer knowledge and skills regarding diverse technological systems.

5. Apply academic competencies, including basic academic skills, thinking skills, and personal qualities related to the workplace.

6. Identify essential products and services provided by the four career cluster areas.

7. Use measurement and assessment skills, including language, math, and science.

8. Apply creative problem solving abilities.

9. Apply team work and leadership skills as related to the workplace.

10. Identify the available vocational-technical education programs best suited for continued career development.

TECHNOLOGY DISCOVERY
COURSE OUTLINE

Unit #	Unit Title	No. of Days
1	Overview of Technology Discovery Course	5
2	Introduction to Technology	10
3	Aerospace Technology	10
4	Audio/Video Communications Technology	10
5	Biomedical Technology	10
6	Computer Aided Design and Drafting Technology	10
7	Computer Imaging Technology	10
8	Electrical Technology	10
9	Engineering Structures Technology	10
10	Environmental Technology	10
11	Laser Technology	10
12	Manufacturing Management Technology	10
13	Production/Processing Technology	10
14	Robotics Technology	10
15	Satellite Communications Technology	10
16	Emerging Technologies	5

SECTION I:

CURRICULUM FRAMEWORK

(COMPETENCIES AND SUGGESTED OBJECTIVES)

COMPETENCIES AND SUGGESTED OBJECTIVES

1. Apply policies and procedures for participating in the Technology Discovery course.
   a. Describe policies and procedures associated with this course.
   b. Describe general safety procedures associated with lab activities.
   c. Inventory equipment and materials located in the modular workstations.
   d. Update his or her Career Educational Plan to reflect activities accomplished (ongoing throughout the year).
   e. Maintain a laboratory journal of activities and objectives (ongoing throughout the year).
   f. Demonstrate simple computer skills (ongoing throughout the year).
   g. Develop leadership, citizenship, and networking skills.
2. Identify the module workstations and the instructional resources provided in the Technology Discovery laboratory.
   a. Identify the modular workstations and associate them with the technologies presented.
   b. Identify the instructional resources provided in the laboratory, including the textbooks, magazines, and the Emerging Technology Research Center (ETRC).
3. Describe major concepts of technology.
   a. Define technology.
   b. Explain means by which technology affects our daily lives.
   c. Define systems and subsystems.
   d. Diagram and describe the operation of a simple system.
   e. Explain the characteristics of the major forms of energy.
   f. Describe resources used in technology.
   g. Describe the major families of technology (transportation, communication, production, and biotechnology).
   h. Demonstrate the steps of the problem solving process.
4. Apply terms and concepts related to air transportation and aerospace technology.
   a. Define terms associated with air transportation and aerospace technology.
   b. Identify science concepts as related to air transportation and aerospace technology.
   c. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in air transportation and aerospace technology.
   d. Apply communications in the development of solutions to technological problems.
   e. Describe/diagram an aspect of air transportation and aerospace technology using the universal systems model.
5. Apply air transportation and aerospace technology in the career cluster areas.
   a. Identify applications of air transportation and aerospace technology related to the career clusters.
   b. Design, construct, and evaluate the efficiency of an aerospace vehicle.

6. Apply terms and concepts related to audio/video communications technology.
   a. Define terms related to audio/video communications technology.
   b. Identify science concepts as related to audio/video communications technology.
   c. Identify applications of audio/video communications technology in each of the career clusters.
   d. Describe how electronics is used in audio/video communications systems.
   e. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in audio/video communications technology.
   f. Apply communications in the development of solutions to technological problems.
   g. Describe/diagram an aspect of audio/video communications technology using the universal systems model.
7. Apply audio/video communications technology in one of the four career cluster areas.
   a. Prepare and present an audio/video presentation to include preparing the script, shooting footage, editing footage, and presenting the final product.
   b. Identify ways in which audio/video communications technology relates to the career clusters.
8. Apply terms and concepts related to biomedical technology.
   a. Define terms associated with biomedical technology.
   b. Identify science concepts as related to biomedical technology.
   c. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in biomedical technology.
   d. Apply communications in the development of solutions to technological problems.
   e. Describe/diagram an aspect of biomedical technology using the universal systems model.
9. Apply biomedical technology in one of the career cluster areas.
   a. Identify applications of biomedical technology related to the career clusters.
   b. Apply biomedical technology concepts to the career cluster areas.
10. Apply terms and concepts related to computer aided design and drafting technology.
   a. Define terms associated with computer aided design and drafting technology.
   b. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in computer aided design and drafting technology.
   c. Apply communications in the development of solutions to technological problems.
   d. Describe/diagram an aspect of computer aided design and drafting technology using the universal systems model.

11. Apply computer aided design and drafting technology in the career cluster areas.
    a. Identify applications of computer aided design and drafting technology related to the career clusters.
    b. Produce a folder of computer aided design and drafting designs to demonstrating applications of the career cluster areas.
12. Describe terms and concepts related to computer imaging technology.
    a. Define terms associated with computer imaging technology.
    b. Identify means of computer imaging.
    c. Identify science concepts as related to computer imaging technology.
    d. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in computer imaging technology.
    e. Apply communications in the development of solutions to technological problems.
    f. Describe/diagram an aspect of computer imaging technology using the universal systems model.
13. Apply computer imaging technology in one of the four occupational cluster areas.
    a. Identify applications of computer imaging related to the career clusters.
    b. Apply computer imaging technology in the career clusters.
14. Apply terms and concepts related to electrical technology.
    a. Define terms associated with electrical technology.
    b. Identify science concepts as related to electrical technology.
    c. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in electrical technology.
    d. Apply communications in the development of solutions to technological problems.
    e. Describe/diagram an aspect of electrical technology using the universal systems model.
15. Apply electrical technology in one of the four occupational cluster areas.
    a. Identify applications of electrical technology related to the career clusters.
    b. Apply electrical technology concepts to the career clusters.
16. Apply terms and concepts related to engineering structures technology.
    a. Define terms associated with engineering structures technology.
    b. Identify science concepts as related to engineering structures technology.
    c. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in engineering structures technology.
    d. Apply communications in the development of solutions to technological problems.
    e. Describe/diagram an aspect of engineering structures technology using the universal systems model.
17. Apply engineering structures technology in one of the four career cluster areas.
    a. Design, build, and test a balsa wood model of an engineering structure.

b. Identify, on the student model, forces which act upon the engineering structure.
c. Identify ways in which the design and construction of engineering structures relate to the career clusters.

18. Apply terms and concepts related to environmental technology.
    a. Define terms associated with environmental technology.
    b. Identify science concepts as related to environmental technology.
    c. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in environmental technology.
    d. Apply communications in the development of solutions to technological problems.
    e. Describe/diagram an aspect of environmental technology using the universal systems model.
19. Apply environmental technology in the career cluster areas.
    a. Identify applications of environmental technology related to the career clusters.
    b. Apply environmental technology concepts.
20. Apply terms and concepts related to laser and fiber optics technology.
    a. Define terms associated with laser and fiber optics technology.
    b. Identify science concepts as related to laser and fiber optics technology.
    c. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in laser and fiber optics technology.
    d. Apply communications in the development of solutions to technological problems.
    e. Describe/diagram an aspect of laser and fiber optics technology using the universal systems model.
21. Apply laser and fiber optics technology in one of the four career cluster areas.
    a. Identify applications of laser and fiber optics technology related to the career clusters.
    b. Conduct activities related to laser and fiber optics technology in the career cluster areas.
22. Apply terms and concepts related to manufacturing management technology.
    a. Define terms associated with manufacturing management technology.
    b. Identify science concepts as related to manufacturing management technology.
    c. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in manufacturing management.
    d. Apply communications in the development of solutions to technological problems.
    e. Describe/diagram an aspect of manufacturing management technology using the universal systems model.

23. Apply manufacturing management technology in the career cluster areas.
    a. Identify applications of manufacturing management related to the career clusters.
    b. Simulate decision making in the management of an enterprise in the cluster areas.
24. Apply terms and concepts related to production/processing technology.
    a. Define terms associated with production/processing technology.
    b. Identify science concepts as related to production/processing technology.
    c. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in production/ processing technology.
    d. Apply communications in the development of solutions to technological problems.
    e. Describe/diagram an aspect of production/processing technology using the universal systems model.
25. Apply production/processing technology in the career cluster areas.
    a. Identify applications of production/processing technology related to the career clusters.
    b. Conduct activities related to production/processing technology in the career cluster areas.
26. Describe terms and concepts related to robotics technology.
    a. Define terms associated with robotics technology.
    b. Identify science concepts as related to robotics technology.
    c. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in robotics technology.
    d. Apply communications in the development of solutions to technological problems.
    e. Describe/diagram an aspect of robotics technology using the universal systems model.
27. Apply robotics technology in one of the four career cluster areas.
    a. Identify ways in which robotics technology relates to the career clusters.
    b. Perform robotics activities in the career cluster areas.
28. Apply terms and concepts related to satellite communications technology.
    a. Define terms associated with satellite communications technology.
    b. Identify science concepts as related to satellite communications technology.
    c. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in satellite communications technology.
    d. Apply communications in the development of solutions to technological problems.
    e. Describe/diagram an aspect of satellite communications technology using the universal systems model.

29. Apply satellite communications technology in the career cluster areas.
    a. Identify applications of satellite communications technology related to the career clusters.
    b. Conduct activities related to satellite communications technology in the career cluster areas.
30. Research, develop, and present to the class a 5-10 minute presentation, with visuals, on emerging technology related to the career cluster of the student's choice.
    a. Conduct research using the Emerging Technology Research Center (ETRC) to develop a written report with visuals on emerging technology related to the career cluster of the student's choice.
    b. Apply communications in the development of solutions to technological problems.
    c. Make a 5-10 minute oral presentation to the class of this written report.
    d. Apply telecommunications search procedures to obtain research information.
    e. Maintain a World Wide Web (WWW) home page to network with other schools and students.
    f. Conduct a cooperative project with another school through Internet communications.

SECTION II:

CURRICULUM GUIDE

FOR

TECHNOLOGY DISCOVERY

TECHNOLOGY DISCOVERY
UNIT 1: OVERVIEW OF TECHNOLOGY DISCOVERY COURSE (5 days)

Competencies and Suggested Objectives:

1. Apply policies and procedures for participating in the Technology Discovery course.
   a. Describe policies and procedures associated with this course.
   b. Describe general safety procedures associated with lab activities.
   c. Inventory equipment and materials located in the modular workstations.
   d. Update his or her Career Educational Plan to reflect activities accomplished (ongoing throughout the year).
   e. Maintain a laboratory journal of activities and objectives (ongoing throughout the year).
   f. Demonstrate simple computer skills (ongoing throughout the year).
   g. Develop leadership, citizenship, and networking skills.
2. Identify the module workstations and the instructional resources provided in the Technology Discovery laboratory.
   a. Identify the modular workstations and associate them with the technologies presented.
   b. Identify the instructional resources provided in the laboratory, including the textbooks, magazines, and the Emerging Technology Research Center (ETRC).

Suggested Teaching Strategies:

Conference, demonstration, and educational media.

Suggested Assessment Strategies:

1. *Describe and apply policies and procedures for participating in the Technology Discovery course.*
   a. Test - School policies, laboratory procedures, and safety procedures.
   b. Assignment - Update Career/Educational Plan.
   c. Assignment - Maintain daily journal (Ongoing throughout the course).
   d. Performance Activity - Demonstrate computer skills.
2. *Identify the module workstations and the instructional resources provided in the Technology Discovery laboratory.*
   a. Performance Activity - Inventory equipment and material in a modular workstation.

b. *Performance Activity - Inventory textbooks and resources provided in the laboratory.*
c. *Performance Activity - Perform an electronic search of a limited topic using Microsoft Encarta or Bookshelf.*

Suggested References:

Instructor's Notes
Local Policies
Instructional Management System
Resource Library:

A resource library containing books, magazines, etc. should be developed within the Technology Discovery laboratory for students to use in identifying and describing technological applications in the different occupational clusters. The Emerging Technology Research Center (ETRC) is a resource provided for this purpose to allow students and instructors to keep abreast and acquire additional knowledge of the ever-changing technology that surrounds each of us. The students will have access to resources such as encyclopedias, reference libraries, bulletin boards, on-line services, and other avenues to the information superhighway.

TECHNOLOGY DISCOVERY
UNIT 2: INTRODUCTION TO TECHNOLOGY (10 days)

Competencies and Suggested Objectives:

1. Describe major concepts of technology.
   a. Define technology.
   b. Explain means by which technology affects our daily lives.
   c. Define systems and subsystems.
   d. Diagram and describe the operation of a simple system.
   e. Explain the characteristics of the major forms of energy.
   f. Describe resources used in technology.
   g. Describe the major families of technology (transportation, communication, production, and biotechnology).
   h. Demonstrate the steps of the problem solving process.

Suggested Teaching Strategies:

Student readings, audio-visual presentations, discussion

Suggested Assessment Strategies:

1. *Describe major concepts of technology.*
   a. Test - Terminology appropriate to this unit.
   b. Test - Impact of technology in the daily lives of students.
   c. Test - Definitions of technological systems and sub-systems.
   d. Assignment - Describe the operation of a simple system using the universal systems model.
   e Assignment - Explain characteristics of the major forms of energy and how each can be used to do work.
   f. Assignment - Describe resources used in technology.
   g. Assignment - Describe the major families of technology (transportation, communication, production, and biotechnology).
   h. Performance Activity - Demonstrate the steps of the problem solving process.

Suggested References:

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* Primary text
** Reference texts

TECHNOLOGY DISCOVERY
UNIT 3: AEROSPACE TECHNOLOGY (10 days)

Competencies and Suggested Objectives:

1. Apply terms and concepts related to air transportation and aerospace technology.
   a. Define terms associated with air transportation and aerospace technology.
   b. Identify science concepts as related to air transportation and aerospace technology.
   c. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in air transportation and aerospace technology.
   d. Apply communications in the development of solutions to technological problems.
   e. Describe/diagram an aspect of air transportation and aerospace technology using the universal systems model.
2. Apply air transportation and aerospace technology in the career cluster areas.
   a. Identify applications of air transportation and aerospace technology related to the career clusters.
   b. Design, construct, and evaluate the efficiency of an aerospace vehicle.

Suggested Teaching Strategies:

Modular Instruction Method - Students will master the competencies by working in teams and following the instructions and activities detailed in a ten-day instructional module. Specifically, the student will:

1. *Define terms associated with air transportation and aerospace technology.*
2. *Identify science concepts related to air transportation and aerospace technology.*
3. *Apply mathematical calculations, concepts, and measurements in the development of solutions to technical problems in air transportation and aerospace technology.*
4. *Apply communications in the development of solutions to technological problems.*
5. *Describe/diagram an aspect of air transportation and aerospace technology using the universal systems model.*
6. *Describe factors that affect air transportation and aerospace technology.*
7. *Describe the effect of weight distribution on an airplane.*
8. *Build and balance a balsa wood airplane.*
9. *Build and balance a paper airplane.*
10. *Fly a paper and/or balsa wood airplane and collect data on performance.*
11. *Select a template to use to build each of the pieces of an airplane and explain why those pieces were chosen.*

12. *Analyze the impact of variables such as aircraft size, wing shape, wing loading, aircraft use, engine type, and power loading on an aircraft in regards to performance, capability, economy, environment, and safety.*

Suggested Assessment Strategies:

1. *Describe terms and concepts related to air transportation and aerospace technology.*
   a. *Test - Define terms associated with air transportation and aerospace technology.*
   b. *Assignment - Identify science concepts as related to air transportation and aerospace technology.*
   c. *Assignment - Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in air transportation and aerospace technology.*
   d. *Assignment - Apply communications in the development of solutions to technological problems.*
   e. *Assignment - Describe/diagram an aspect of air transportation and aerospace technology using the universal systems model.*
2. *Apply air transportation and aerospace technology in the career cluster areas.*
   a. *Assignment - Describe factors that affect air transportation and aerospace technology.*
   b. *Assignment - Describe the effect of weight distribution on an air plane.*
   c. *Performance Activity - Build and balance a balsa wood airplane.*
   d. *Performance Activity - Build and balance a paper airplane.*
   e. *Performance Activity - Fly a paper and/or balsa wood airplane and collect data on performance.*
   f. *Assignment - Select a template to use to build each of the pieces of an airplane and explain why those pieces were chosen.*
   g. *Assignment - Analyze the impact of variables such as aircraft size, wing shape, wing loading, aircraft use, engine type, and power loading on an aircraft in regards to performance, capability, economy, environment, and safety.*

Suggested References:

Air Transportation/Aerodynamics Technology Module, AES Model #1102 MTTA, Technical Training Aids, Madison, Mississippi.

TECHNOLOGY DISCOVERY
UNIT 4: AUDIO/VIDEO COMMUNICATIONS TECHNOLOGY (10 days)

Competencies and Suggested Objectives:

1. Apply terms and concepts related to audio/video communications technology.
   a. Define terms related to audio/video communications technology.
   b. Identify science concepts as related to audio/ video communications technology.
   c. Identify applications of audio/video communications technology in each of the career clusters.
   d. Describe how electronics is used in audio/video communications systems.
   e. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in audio/video communications technology.
   f. Apply communications in the development of solutions to technological problems.
   g. Describe/diagram an aspect of audio/video communications technology using the universal systems model.
2. Apply audio/video communications technology in one of the four career cluster areas.
   a. Prepare and present an audio/video presentation to include preparing the script, shooting footage, editing footage, and presenting the final product.
   b. Identify ways in which audio/video communications technology relates to the career clusters.

Suggested Teaching Strategies:

Modular Instruction Method - Students will master the competencies by working in teams and following the instructions and activities detailed in a ten-day instructional module. Specifically, the student will:

1. *Identify audio/video concepts using modular instructional media.*
2. *Perform basic tasks using audio/video equipment, including a mixer, character generator, video recorder, and video camera.*
3. *Identify occupational duties of broadcast production personnel.*
4. *Conduct a video interview.*
5. *Produce a commercial.*
6. *Build a story board to produce a news broadcast.*
7. *Edit videotape for use in a news broadcast.*
8. *Associate tasks performed in the broadcast industry with careers in the four career cluster areas.*
9. *Compile vocabulary words and meanings.*

10. *Time a news broadcast and calculate "time-use" in program productions.*
11. *Prepare a weather broadcast using observable weather conditions.*
12. *Write a paragraph applying audio/video communications technology to the four career cluster areas.*
13. *Describe/diagram an aspect of audio/video communications technology using the universal systems model.*

Suggested Assessment Strategies:

1. *Apply terms and concepts related to audio/video communications technology.*
   a. *Test - Terms and concepts for audio/video production.*
   b. *Assignment - Associate tasks performed in audio/video communications to careers.*
   c. *Performance Activity - Coordinate written instructions to hands-on activities.*
   d. *Assignment - Calculate "time use" in program productions.*
   e. *Assignment - Describe/diagram an aspect of audio/video communications technology using the universal systems model.*
   f. *Assignment - Apply communications in the development of solutions to technological problems.*
   g. *Assignment - Identify ways in which audio/video communications technology relates to the career clusters.*
2. *Apply audio/video communications technology in one of the four career cluster areas.*
   a. *Performance Activity - Use a video camera and editing system.*
   b. *Performance Activity - Generate titles, graphics, and special effects.*
   c. *Performance Activity - Produce a story board and script.*
   d. *Performance Activity - Produce a video commercial.*
   e. *Performance Activity - Produce a news broadcast.*
   f. *Performance Activity - Produce a weather broadcast.*

Suggested References:

Audio/Video Communications Technology Module, Bowie Audio Visual Enterprises, Inc., Jackson, Mississippi.

TECHNOLOGY DISCOVERY
UNIT 5: BIOMEDICAL TECHNOLOGY (10 days)

Competencies and Suggested Objectives:

1. Apply terms and concepts related to biomedical technology.
   a. Define terms associated with biomedical technology.
   b. Identify science concepts as related to biomedical technology.
   c. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in biomedical technology.
   d. Apply communications in the development of solutions to technological problems.
   e. Describe/diagram an aspect of biomedical technology using the universal systems model.
2. Apply biomedical technology in one of the career cluster areas.
   a. Identify applications of biomedical technology related to the career clusters.
   b. Apply biomedical technology concepts to the career cluster areas.

Suggested Teaching Strategies:

Modular Instruction Method - Students will master the competencies by working in teams and following the instructions and activities detailed in a ten-day instructional module. Specifically, the student will:

1. *Explain anatomy and physiology of human biological systems.*
2. *Measure diastolic and systolic blood pressure using a computer controlled instrument.*
3. *Prepare graphs and charts of blood pressure and heart readings under varying stress levels.*
4. *Predict reaction time using a visual stimulus.*
5. *Perform practical use of medical reference dictionaries on CD-ROM.*
6. *Use a CD-ROM computer software program to simulate the operation, care, and treatment of problems of the human heart.*
7. *Use a CD-ROM computer software simulation program to diagnose and prescribe care for a variety of diseases and disorders.*
8. *Conduct a career research project involving health care careers.*
9. *Analyze problems of sleep deprivation using a videotape.*
10. *Observe applications of technology in medicine, sports and health using a CD-ROM and videotape.*
11. *Describe/diagram an aspect of biomedical technology using the universal systems model.*

Suggested Assessment Strategies:

1. *Apply terms and concepts related to biomedical technology.*
   a. *Test - Define terms associated with biomedical technology.*
   b. *Test - Identify science concepts as related to biomedical technology.*
   c. *Assignment - Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in biomedical technology.*
   d. *Assignment - Apply communications in the development of solutions to technological problems.*
   e. *Assignment - Describe/diagram an aspect of biomedical technology using the universal systems model.*
   f. *Assignment - Explain anatomy and physiology of the human physiological systems.*
2. *Apply biomedical technology in one of the career cluster areas.*
   a. *Performance Activity - Measure diastolic and systolic blood pressure using a computer controlled instrument.*
   b. *Performance Activity - Prepare graphs and charts of blood pressure and heart readings under varying stress levels.*
   c. *Performance Activity - Predict reaction time using a visual stimulus.*
   d. *Performance Activity - Perform practical use of medical reference dictionaries on CD-ROM.*
   e. *Performance Activity - Use a CD-ROM computer software program to simulate the operation, care, and treatment of problems of the human heart.*
   f. *Performance Activity - Use a CD-ROM computer software simulation program to diagnose and prescribe care for variety of diseases and disorders.*
   g. *Assignment - Conduct a career research project involving health care careers.*
   h. *Assignment - Analyze problems of sleep deprivation using a videotape.*
   i. *Assignment - Observe applications of technology in medicine, sports and health using a CD-ROM and videotape.*

Suggested References:

Biotech Technology Module (IBM/CD-ROM), #72-1210, Graves-Humphreys, Roanoke, Virginia.

TECHNOLOGY DISCOVERY
UNIT 6: COMPUTER AIDED DESIGN AND DRAFTING TECHNOLOGY (10 days)

Competencies and Suggested Objectives:

1. Apply terms and concepts related to computer aided design and drafting technology.
   a. Define terms associated with computer aided design and drafting technology.
   b. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in computer aided design and drafting technology.
   c. Apply communications in the development of solutions to technological problems.
   d. Describe/diagram an aspect of computer aided design and drafting technology using the universal systems model.
2. Apply computer aided design and drafting technology in the career cluster areas.
   a. Identify applications of computer aided design and drafting technology related to the career clusters.
   b. Produce a folder of computer aided design and drafting designs to demonstrating applications of the career cluster areas.

Suggested Teaching Strategies:

Modular Instruction Method - Students will master the competencies by working in teams and following the instructions and activities detailed in a ten-day instructional module. Specifically, the student will:

1. *Perform basic computer operation, including booting the computer, operation of CAD/CAM software, and utilization of the main menu and related programs.*
2. *Demonstrate how to read a drawing.*
3. *Define terms used in CAD/CAM/CNC.*
4. *Demonstrate basics of computer aided design and drafting by producing a series of drawings.*

Suggested Assessment Strategies:

1. *Describe terms and concepts related to computer aided design and drafting technology.*
   a. *Test - Define terms associated with computer aided design and drafting technology.*

b. *Assignment - Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in computer aided design and drafting technology.*
c. *Assignment - Apply communications in the development of solutions to technological problems.*
d. *Assignment - Describe/diagram an aspect of computer aided design and drafting technology using the universal systems model.*

2. *Apply computer aided design and drafting technology in the career cluster areas.*
   a. *Performance Activity - Perform basic computer operation, including booting the computer, operation of CAD/CAM software, and utilization of the main menu and related programs.*
   b. *Performance Activity - Demonstrate how to read a drawing.*
   c. *Performance Activity - Demonstrate basics of computer aided design and drafting by producing a series of drawings which illustrate applications in the career cluster areas.*

Suggested References:

CAD Design Technology Module, D&M Computing #001-730053, Magee Enterprises, Brandon, Mississippi.

TECHNOLOGY DISCOVERY
UNIT 7: COMPUTER IMAGING TECHNOLOGY (10 days)

Competencies and Suggested Objectives:

1. Describe terms and concepts related to computer imaging technology.
   a. Define terms associated with computer imaging technology.
   b. Identify means of computer imaging.
   c. Identify science concepts as related to computer imaging technology.
   d. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in computer imaging technology.
   e. Apply communications in the development of solutions to technological problems.
   f. Describe/diagram an aspect of computer imaging technology using the universal systems model.
2. Apply computer imaging technology in one of the four occupational cluster areas.
   a. Identify applications of computer imaging related to the career clusters.
   b. Apply computer imaging technology in the career clusters.

Suggested Teaching Strategies:

Modular Instruction Method - Students will master the competencies by working in teams and following the instructions and activities detailed in a ten-day instructional module. Specifically, the student will:

1. *Capture, alter, and print images using the digital camera.*
2. *Import and export images.*
3. *Use desktop publishing software.*
4. *Write an autobiography and include a digitized image.*
5. *Design and create a product brochure including a digitized image.*
6. *Perform graphics and text scanning using a scanner.*
7. *Use optical character recognition software.*
8. *Create a computer generated animation sequence.*
9. *Describe/diagram an aspect of computer imaging technology using the universal systems model.*

Suggested Assessment Strategies:

1. *Apply terms and concepts related to computer imaging technology.*
   a. *Test - Test to define terms associated with computer imaging technology.*
   b. *Test - Test to identify means of computer imaging technology.*

c. *Assignment - Identify science concepts as related to computer imaging technology.*
d. *Assignment - Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in computer imaging technology.*
e. *Assignment - Apply communications in the development of solutions to technological problems.*
f. *Assignment - Describe/diagram an aspect of computer imaging technology using the universal systems model.*
f. *Assignment - Write an autobiography and include a digitized image.*

2. *Apply computer imaging technology in one of the four occupational cluster areas.*
   a. *Performance Activity - Capture, alter, and print images using the digital camera.*
   b. *Performance Activity - Import and export images.*
   c. *Performance Activity - Use desktop publishing software.*
   d. *Performance Activity - Design and create a product brochure including a digitized image.*
   e. *Performance Activity - Perform graphics and text scanning using a scanner.*
   f. *Performance Activity - Use optical character recognition software.*
   g. *Performance Activity - Create a computer generated animation sequence.*

Suggested References:

Computer Applications Module (IBM), #72-0452, Graves-Humphreys, Roanoke, Virginia.

TECHNOLOGY DISCOVERY
UNIT 8: ELECTRICAL TECHNOLOGY **(10 days)**

Competencies and Suggested Objectives:

1. Apply terms and concepts related to electrical technology.
   a. Define terms associated with electrical technology.
   b. Identify science concepts as related to electrical technology.
   c. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in electrical technology.
   d. Apply communications in the development of solutions to technological problems.
   e. Describe/diagram an aspect of electrical technology using the universal systems model.
2. Apply electrical technology in one of the four occupational cluster areas.
   a. Identify applications of electrical technology related to the career clusters.
   b. Apply electrical technology concepts to the career clusters.

Suggested Teaching Strategies:

Modular Instruction Method - Students will master the competencies by working in teams and following the instructions and activities detailed in a ten-day instructional module. Specifically, the student will:

1. *Define terms associated with electrical technology.*
2. *Identify science concepts as related to electrical technology.*
3. *Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in power generation technology.*
4. *Describe/diagram an aspect of electrical technology using the universal systems model.*
5. *Apply communications in the development of solutions to technological problems.*
6. *Identify the impacts of the future growth of the power utilities.*
7. *Demonstrate how to measure electrical energy.*
8. *Demonstrate how to measure voltage.*
9. *Diagram and describe a series circuit.*
10. *Describe the use of electrical power to make light.*
11. *Explain the need for electrical energy conservation.*
12. *Identify applications of electrical technology to the four career cluster areas.*
13. *Analyze the impact of variables such as type of power generation; plant size; population; alternate energy sources; and their effects on operating cost, construction cost, air quality, social quality, and cost of energy.*

Suggested Assessment Strategies:

1. *Apply terms and concepts related to electrical technology.*
   a. *Test - Define terms associated with electrical technology.*
   b. *Test - Identify science concepts as related to electrical technology.*
   c. *Assignment - Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in electrical technology.*
   d. *Assignment - Apply communications in the development of solutions to technological problems.*
   e. *Assignment - Describe/diagram an aspect of electrical technology using the universal systems model.*
2. *Apply electrical technology in one of the four occupational cluster areas.*
   a. *Assignment - Identify the impact of the future growth of the power utilities.*
   b. *Performance Activity - Demonstrate how to measure electrical energy.*
   c. *Performance Activity - Demonstrate how to measure voltage.*
   d. *Performance Activity - Diagram and describe a series circuit.*
   e. *Assignment - Describe the use of electrical power to make light.*
   f. *Assignment - Explain the need for electrical energy conservation.*
   g. *Assignment - Identify applications of electrical technology related to the four career cluster areas.*
   h. *Assignment - Analyze the impact of variables such as type of power generation; plant size; population; alternate energy sources; and their effects on operating cost, construction cost, air quality, social quality, and cost of energy.*

Suggested References:

Power Generation/Basic Electricity Technology Module, AES Model 1201 MTTA, Technical Training Aids, Madison, Mississippi.

TECHNOLOGY DISCOVERY
UNIT 9: ENGINEERING STRUCTURES TECHNOLOGY (10 days)

Competencies and Suggested Objectives:

1. Apply terms and concepts related to engineering structures technology.
   a. Define terms associated with engineering structures technology.
   b. Identify science concepts as related to engineering structures technology.
   c. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in engineering structures technology.
   d. Apply communications in the development of solutions to technological problems.
   e. Describe/diagram an aspect of engineering structures technology using the universal systems model.
2. Apply engineering structures technology in one of the four career cluster areas.
   a. Design, build, and test a balsa wood model of an engineering structure.
   b. Identify, on the student model, forces which act upon the engineering structure.
   c. Identify ways in which the design and construction of engineering structures relate to the career clusters.

Suggested Teaching Strategies:

Modular Instruction Method - Students will master the competencies by working in teams and following the instructions and activities detailed in a ten-day instructional module. Specifically, the student will:

1. *Define terms associated with engineering structures technology.*
2. *Identify science concepts as related to bridge building technology.*
3. *Apply mathematical calculations, concepts, and measurements in the development of solutions to technical problems in engineering structures technology.*
4. *Apply communications in the development of solutions to technological problems.*
5. *Describe/diagram an aspect of engineering structures technology using the universal systems model.*
6. *Identify social and economic impacts of bridge building.*
7. *Identify different types of bridges.*
8. *Demonstrate a bridge design using a software program.*
9. *Design, build, and test a balsa wood model of a bridge.*
10. *Identify the forces at work on the various parts of the bridge and explain the bridge model's strengths and weaknesses.*

11. *Analyze the impact of variables such as type of bridge, location, obstructions, number of lanes, number of spans, and longest span on a bridge in regard to economy, traffic volume, dynamic load, environmental impact, and social impact.*

Suggested Assessment Strategies:

1. *Apply terms and concepts related to engineering structures technology.*
   a. *Test - Define terms associated with engineering structures technology.*
   b. *Test - Identify science concepts as related to engineering structures technology.*
   c. *Assignment - Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in engineering structures technology.*
   d. *Assignment - Apply communications in the development of solutions to technological problems.*
   e. *Assignment - Describe/diagram an aspect of engineering structures technology using the universal systems model.*
   e. *Assignment - Identify the forces at work on the various parts of the bridge and explain the bridge model's strengths and weaknesses.*
   g. *Assignment - Analyze the impact of variables such as type of bridge, location, obstructions, number of lanes, number of spans, and longest span on a bridge in regard to economy, traffic volume, dynamic load, environmental impact, and social impact.*
2. *Apply engineering structures technology in one of the four occupational cluster areas.*
   a. *Assignment - Identify different types of bridges.*
   b. *Performance Activity - Demonstrate a bridge design using a software program.*
   c. *Performance Activity - Design, build, and test a balsa wood model of a bridge.*
   d. *Performance Activity - Practical exercise to identify, on the student model, forces which act upon the engineering structure.*

Suggested References:

Engineering Structures Technology Module, AES Model #1301MTTA, Technical Training Aids, Madison, Mississippi.

TECHNOLOGY DISCOVERY
UNIT 10: ENVIRONMENTAL TECHNOLOGY (10 days)

Competencies and Suggested Objectives:

1. Apply terms and concepts related to environmental technology.
   a. Define terms associated with environmental technology.
   b. Identify science concepts as related to environmental technology.
   c. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in environmental technology.
   d. Apply communications in the development of solutions to technological problems.
   e. Describe/diagram an aspect of environmental technology using the universal systems model.
2. Apply environmental technology in the career cluster areas.
   a. Identify applications of environmental technology related to the career clusters.
   b. Apply environmental technology concepts.

Suggested Teaching Strategies:

Modular Instruction Method - Students will master the competencies by working in teams and following the instructions and activities detailed in a ten-day instructional module. Specifically, the student will:

1. *Use a computer software program to identify concepts of environment and ecology.*
2. *Perform water quality investigations, including acid rain studies.*
3. *Perform composting experiments.*
4. *Explain air quality management and the effects of transportation and industry on air quality.*
5. *Investigate the commercial implications, careers, and business opportunities in hydroponics.*
6. *Conduct hydroponics experiments and plant growth within a closed environment.*
7. *Explain environmental accountability, recycling, and resource management from observation of videotapes.*
8. *Explain the problems of waste management.*
9. *Use a CD-ROM program for a career research project involving environment and ecology.*
10. *Describe/diagram an aspect of environmental technology using the universal systems model.*

Suggested Assessment Strategies:

1. *Describe terms and concepts related to environmental technology.*
   a. *Test - Define terms associated with environmental technology.*
   b. *Test - Identify science concepts as related to environmental technology.*
   c. *Assignment - Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in environmental technology.*
   d. *Assignment - Apply communications in the development of solutions to technological problems.*
   e. *Assignment - Describe/diagram an aspect of environmental technology using the universal systems model.*
2. *Apply environmental technology in the career cluster areas.*
   a. *Assignment - Use a computer software program to identify concepts of environment and ecology.*
   a. *Performance Activity - Perform water quality investigations, including acid rain studies.*
   b. *Performance Activity - Perform composting experiments.*
   c. *Assignment - Explain air quality management and the effects of transportation and industry on air quality.*
   d. *Assignment - Investigate the commercial implications, careers, and business opportunities in hydroponics.*
   e. *Performance Activity - Conduct hydroponics experiments and plant growth within a closed environment.*
   f. *Assignment - Explain environmental accountability, recycling, and resource management from observation of videotapes.*
   g. *Assignment - Explain the problems of waste management.*
   h. *Assignment - Use a CD-ROM program for a career research project involving environment and ecology.*

Suggested References:

Environment and Ecology Technology Module (IBM/CD-ROM), #72-1108, Graves-Humphreys, Roanoke, Virginia.

TECHNOLOGY DISCOVERY
UNIT 11: LASER TECHNOLOGY **(10 days)**

Competencies and Suggested Objectives:

1. Apply terms and concepts related to laser and fiber optics technology.
   a. Define terms associated with laser and fiber optics technology.
   b. Identify science concepts as related to laser and fiber optics technology.
   c. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in laser and fiber optics technology.
   d. Apply communications in the development of solutions to technological problems.
   e. Describe/diagram an aspect of laser and fiber optics technology using the universal systems model.
2. Apply laser and fiber optics technology in one of the four career cluster areas.
   a. Identify applications of laser and fiber optics technology related to the career clusters.
   b. Conduct activities related to laser and fiber optics technology in the career cluster areas.

Suggested Teaching Strategies:

Modular Instruction Method - Students will master the competencies by working in teams and following the instructions and activities detailed in a ten-day instructional module. Specifically, the student will:

1. *Describe laser classifications.*
2. *Describe divergence and inverse relationships.*
3. *Describe reflection and beam splitting.*
4. *Perform measurement and alignment using a laser.*
5. *Perform fiber optics voice communication using the laser.*
6. *Describe laser uses relating to medical, communications, and industrial applications.*
7. *Apply laser safety rules.*
8. *Describe monochromatic light and wavelength.*
9. *Utilize laser intensity measuring devices and detectors.*
10. *Explain filters and the transportation of light.*
11. *Conduct quality control experiments using the laser.*
12. *Describe fiber optics.*
13. *Conduct fiber optics radio communication using the laser.*
14. *Describe/diagram an aspect of laser and fiber optics technology using the universal systems model.*

Suggested Assessment Strategies:

1. *Apply terms and concepts related to laser and fiber optics technology.*
   a. *Test - Terms associated with laser and fiber optics technology.*
   b. *Assignment - Identify applications of laser technology to the career clusters.*
   c. *Test - Science concepts as related to laser and fiber optics technology.*
   d. *Assignment - Mathematical calculations, concepts, and measurements in the development of solutions to technological problems in laser technology.*
   e. *Assignment - Apply communications in the development of solutions to technological problems.*
   f. *Assignment - Describe/diagram an aspect of laser and fiber optics technology using the universal systems model.*
2. *Apply laser and fiber optics technology in one of the four career cluster areas.*
   a. *Performance Activity - Perform measurement and alignment using a laser.*
   b. *Performance Activity - Perform fiber optics voice communication using the laser.*
   c. *Performance Activity - Apply laser safety rules.*
   d. *Performance Activity - Utilize laser intensity measuring devices and detectors.*
   e. *Performance Activity - Conduct quality control experiments using the laser.*
   f. *Performance Activity - Conduct fiber optics radio communication using the laser.*

Suggested References:

Advanced Laser Technology Module, #72-0524, Graves-Humphreys, Roanoke, Virginia.

TECHNOLOGY DISCOVERY
UNIT 12: MANUFACTURING MANAGEMENT TECHNOLOGY (10 days)

Competencies and Suggested Objectives:

1. Apply terms and concepts related to manufacturing management technology.
   a. Define terms associated with manufacturing management technology.
   b. Identify science concepts as related to manufacturing management technology.
   c. Apply mathematical calculations, concepts and measurements in the development of solutions to technological problems in manufacturing management.
   d. Apply communications in the development of solutions to technological problems.
   e. Describe/diagram an aspect of manufacturing management technology using the universal systems model.
2. Apply manufacturing management technology in the career cluster areas.
   a. Identify applications of manufacturing management related to the career clusters.
   b. Simulate decision making in the management of an enterprise in the cluster areas.

Suggested Teaching Strategies:

Modular Instruction Method - Students will master the competencies by working in teams and following the instructions and activities detailed in a ten-day instructional module. Specifically, the student will:

1. *Define terms associated with manufacturing management.*
2. *Identify science concepts related to manufacturing management.*
3. *Apply mathematical calculations, concepts, and measurements in the development of solutions to technical problems in manufacturing management.*
4. *Apply communications in the development of solutions to technological problems.*
5. *Describe how automation affects people and products within a manufacturing plant.*
6. *Demonstrate how to use a computer language to control computer output signals.*
7. *Demonstrate how a computer language can be used to control the movement of two motors on an automated guided vehicle.*
8. *Analyze the relationship between surrounding community, plant capacity, information control, material handling, and level of automation in relationship to product, direct cost, overhead cost, manual jobs, and technical jobs.*
9. *Describe/diagram an aspect of manufacturing management using the universal systems model.*

Suggested Assessment Strategies:

1. *Describe terms and concepts related to manufacturing management technology.*
   a. *Test - Define terms associated with manufacturing management technology.*
   b. *Test - Identify science concepts as related to manufacturing management technology.*
   c. *Assignment - Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in manufacturing management.*
   d. *Assignment - Apply communications in the development of solutions to technological problems.*
   e. *Assignment - Describe/diagram an aspect of manufacturing management technology using the universal systems model.*
   f. *Assignment - Describe how automation affects people and products within a manufacturing plant.*
2. *Apply manufacturing management technology in the career cluster areas.*
   a. *Performance Activity - Demonstrate how to use a computer language to control computer output signals.*
   b. *Performance Activity - Demonstrate how a computer language can be used to control the movement of two motors on an automated guided vehicle.*
   c. *Assignment - Analyze the relationship between surrounding community, plant capacity, information control, material handling, and level of automation in relationship to product, direct cost, overhead cost, manual jobs, and technical jobs.*

Suggested References:

Automobile Manufacturing Management Module, AES Model #1401 MTTA, Technical Training Aids, Madison, Mississippi.

TECHNOLOGY DISCOVERY
UNIT 13: PRODUCTION/PROCESSING TECHNOLOGY (10 days)

Competencies and Suggested Objectives:

1. Apply terms and concepts related to production/processing technology.
   a. Define terms associated with production/processing technology.
   b. Identify science concepts as related to production/processing technology.
   c. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in production/processing technology.
   d. Apply communications in the development of solutions to technological problems.
   e. Describe/diagram an aspect of production/processing technology using the universal systems model.
2. Apply production/processing technology in the career cluster areas.
   a. Identify applications of production/processing technology related to the career clusters.
   b. Conduct activities related to production/processing technology in the career cluster areas.

Suggested Teaching Strategies:

Modular Instruction Method - Students will master the competencies by working in teams and following the instructions and activities detailed in a ten-day instructional module. Specifically, the student will:

1. *Define terms associated with petroleum manufacturing and process control technology.*
2. *Identify science concepts related to petroleum manufacturing and process control technology.*
3. *Apply mathematical calculations, concepts, and measurements in the development of solutions to technical problems in petroleum manufacturing and process control technology.*
4. *Apply communications in the development of solutions to technological problems.*
5. *Describe/diagram an aspect of production/processing technology using the universal systems model.*
6. *Describe factors that affect production/processing technology.*
7. *Demonstrate a manual control system.*
8. *Demonstrate an automatic control system.*
9. *Demonstrate an override automatic control system.*
10. *Demonstrate a shut down for an automatic control system.*
11. *Diagram the fill and drain rate.*

12. *Analyze impact of variables such as cost of raw materials, cost of end products, market demand, cost of refining, environmental impact, and their impact on oil supply, refining policies, energy policies, and time.*

Suggested Assessment Strategies:

1. *Apply terms and concepts related to production/processing technology.*
   a. *Test - Define terms associated with production/processing technology.*
   b. *Assignment - Identify science concepts as related to production/processing technology.*
   c. *Assignment - Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in production/processing technology.*
   d. *Assignment - Apply communications in the development of solutions to technological problems.*
   e. *Assignment - Describe/diagram an aspect of production/processing technology using the universal systems model.*
2. *Apply production/processing technology in the career cluster areas.*
   a. *Assignment - Describe factors that affect production/processing technology.*
   b. *Performance Activity - Demonstrate a manual control system.*
   c. *Performance Activity - Demonstrate an automatic control system.*
   d. *Performance Activity - Demonstrate an override automatic control system.*
   e. *Performance Activity - Demonstrate a shut down for an automatic control system.*
   f. *Performance Activity - Diagram the fill and drain rate.*
   g. *Assignment - Analyze the impact of variables such as cost of raw materials, cost of end products, market demand, cost of refining, environmental impact, and their impact on oil supply, refining policies, energy policies, and time.*

Suggested References:

Petroleum Manufacturing/Process Control Technology Module, AES Model 1402 MTTA, Technical Training Aids, Madison, Mississippi.

TECHNOLOGY DISCOVERY
UNIT 14: ROBOTICS TECHNOLOGY **(10 days)**

Competencies and Suggested Objectives:

1. Describe terms and concepts related to robotics technology.
   a. Define terms associated with robotics technology.
   b. Identify science concepts as related to robotics technology.
   c. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in robotics technology.
   d. Apply communications in the development of solutions to technological problems.
   e. Describe/diagram an aspect of robotics technology using the universal systems model.
2. Apply robotics technology in one of the four career cluster areas.
   a. Identify ways in which robotics technology relates to the career clusters.
   b. Perform robotics activities in the career cluster areas.

Suggested Teaching Strategies:

Modular Instruction Method - Students will master the competencies by working in teams and following the instructions and activities detailed in a ten-day instructional module. Specifically, the student will:

1. *Identify the parts of the robot.*
2. *Explain the technical terms that describe the robot.*
3. *Identify and explain mechanical concepts (cables, pulleys, and gears) that make the various parts of the robot move.*
4. *Write a program recording a set of moves.*
5. *Use the teach pendant to operate the robot.*
6. *Single step through a program.*
7. *Use the robot to assemble two objects.*
8. *Change speeds, pause, and grip to solve a problem.*
9. *Describe each step in a program written by the student.*
10. *Program the robot from the instructions written by someone else.*
11. *Program the robot to turn the lights on and off.*
12. *Mix moves of the robot arm with the lights on the teach pendant (turning lights on and off) to create working programs.*
13. *Describe/diagram an aspect of robotics technology using the universal systems model.*

Suggested Assessment Strategies:

1. *Describe terms and concepts related to robotics technology.*
   a. *Test - Identify parts of the robot and define terms associated with robotics technology.*
   b. *Assignment - Identify science concepts as related to robotics technology.*
   c. *Assignment - Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in robotics technology.*
   d. *Assignment - Apply communications in the development of solutions to technological problems.*
   e. *Assignment - Describe/diagram an aspect of robotics technology using the universal systems model.*
   f. *Assignment - Explain mechanical concepts of robot movement.*
2. *Apply technology in the career cluster areas.*
   a. *Performance Activity - Write a program recording a set of moves.*
   b. *Performance Activity - Operate the robot using the teach pendant.*
   c. *Performance Activity - Single step through a program.*
   d. *Performance Activity - Use the robot to assemble two objects.*
   e. *Performance Activity - Change speeds, pause, and grip to solve a problem.*
   f. *Performance Activity - Describe each step in a program written by the student.*
   g. *Performance Activity - Program the robot from the instructions written by someone else.*
   h. *Performance Activity - Program the robot to turn the lights on and off.*
   i. *Performance Activity - Mix moves of the robot arm with the lights on the teach pendant (turning lights on and off) to create working programs.*

Suggested References:

Questec/Microbot "Teachmover" Robot Technology Module, Technical Training Aids, Madison, Mississippi.

TECHNOLOGY DISCOVERY
UNIT 15: SATELLITE COMMUNICATIONS TECHNOLOGY (10 days)

Competencies and Suggested Objectives:

1. Apply terms and concepts related to satellite communications technology.
   a. Define terms associated with satellite communications technology.
   b. Identify science concepts as related to satellite communications technology.
   c. Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in satellite communications technology.
   d. Apply communications in the development of solutions to technological problems.
   e. Describe/diagram an aspect of satellite communications technology using the universal systems model.
2. Apply satellite communications technology in the career cluster areas.
   a. Identify applications of satellite communications technology related to the career clusters.
   b. Conduct activities related to satellite communications technology in the career cluster areas.

Suggested Teaching Strategies:

Modular Instruction Method - Students will master the competencies by working in teams and following the instructions and activities detailed in a ten-day instructional module. Specifically, the student will:

1. *Define terms associated with satellite communications technology.*
2. *Identify science concepts as related to satellite communications technology.*
3. *Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in satellite communications technology.*
4. *Apply communications in the development of solutions to technological problems.*
5. *Describe/diagram an aspect of satellite communications technology using the universal systems model.*
6. *Interpret images from an operating weather satellite receiver.*
7. *Explain satellite functions and orbital concepts.*
8. *Explain latitude, longitude, and Greenwich Mean Time (GMT).*
9. *Describe how a weather satellite operates and how to view its images.*
10. *Interpret factors which affect the world's weather.*
11. *Interpret cloud formations and relate them to a satellite image.*
12. *Describe weather fronts and identify them on a satellite image.*
13. *Read a weather map and compare it to a satellite image.*

14. Prepare a weather forecast using weather maps and satellite images.

Suggested Assessment Strategies:

1. *Describe terms and concepts related to satellite communications technology.*
   a. *Test - Define terms associated with satellite communications technology.*
   b. *Assignment - Identify science concepts as related to satellite communications technology.*
   c. *Assignment - Apply mathematical calculations, concepts, and measurements in the development of solutions to technological problems in satellite communications technology.*
   d. *Assignment - Apply communications in the development of solutions to technological problems.*
   e. *Assignment - Describe/diagram an aspect of satellite communications technology using the universal systems model.*
2. *Apply satellite communications technology in the career cluster areas.*
   a. *Assignment - Interpret images from an operating weather satellite receiver.*
   b. *Assignment - Explain satellite functions and orbital concepts.*
   c. *Assignment - Explain latitude, longitude, and Greenwich Mean Time (GMT).*
   d. *Assignment - Describe how a weather satellite operates and how to view its images..*
   e. *Performance Activity - Interpret factors which affect the world's weather.*
   f. *Performance Activity - Interpret cloud formations and relate them to a satellite image.*
   g. *Assignment - Describe weather fronts and identify them on a satellite image.*
   h. *Performance Activity - Read a weather map and compare it to a satellite image.*
   i. *Performance Activity - Prepare a weather forecast using weather maps and satellite images.*

Suggested References:

Feedback Educational Satellite Receiver Technology Module, WSR524PCM, Education and Training Consultants (ETC), Madison, Mississippi.

TECHNOLOGY DISCOVERY
UNIT 16: EMERGING TECHNOLOGIES (5 days)

Competencies and Suggested Objectives:

1. Research, develop, and present to the class a 5-10 minute presentation, with visuals, on emerging technology related to the career cluster of the student's choice.
   a. Conduct research using the Emerging Technology Research Center (ETRC) to develop a written report with visuals on emerging technology related to the career cluster of the student's choice.
   b. Apply communications in the development of solutions to technological problems.
   c. Make a 5-10 minute oral presentation to the class of this written report.
   d. Apply telecommunications search procedures to obtain research information.
   e. Maintain a World Wide Web (WWW) home page to network with other schools and students.
   f. Conduct a cooperative project with another school through Internet communications.

Suggested Teaching Strategies:

Modular Instruction Method - Independent research using electronic information resources, written report, and oral report.

Suggested Assessment Strategies:

1. *Research, develop, and present to the class a 5-10 minute presentation with visuals on emerging technology related to the career cluster of the student's choice.*
   a. *Evaluation of written report based on student research and development of emerging technology in the career cluster of the student's choice.*
   b. *Evaluation of the oral presentation of the report of emerging technology related to the occupational cluster of the student's choice. A written copy of the report is to be placed in the student's Career/Educational Plan.*
   c. *Evaluation of visuals used in student presentation.*
   d. *Evaluation of the laboratory journal, assignments, and other activities.*
   e. *Assignment - Apply telecommunications search procedures to obtain research information.*
   f. *Assignment - Maintain a World Wide Web (WWW) home page to network with other schools and students.*

g. Assignment - Conduct a cooperative project with another school through Internet communications.

Suggested References:

Resource Library:

A resource library containing books, magazines, etc. provided within the Technology Discovery laboratory for students to use in identifying and describing technological applications in the different occupational clusters. The Emerging Technology Research Center (ETRC) is a resource provided for this purpose to allow students and instructors to keep abreast and acquire additional knowledge of the ever-changing technology that surrounds each of us. The students will have access to resources such as encyclopedias, reference libraries, bulletin boards, on-line services, and other avenues to the information superhighway.

APPENDIX A:

STUDENT COMPETENCY PROFILE

STUDENT COMPETENCY PROFILE FOR TECHNOLOGY DISCOVERY

Student: _____

This record is intended to serve as a method of noting student achievement of the competencies in each unit. It can be duplicated for each student and serve as a cumulative record of competencies achieved in the course.

In the blank before each competency, place the date on which the student mastered the competency.

Competencies and Suggested Objectives:

Unit 1: Overview of Technology Discovery Course

_____ 1. Apply policies and procedures for participating in the Technology Discovery course.

_____ 2. Identify the module workstations and the instructional resources provided in the Technology Discovery laboratory.

Unit 2: Introduction to Technology

_____ 1. Describe major concepts of technology.

Unit 3: Aerospace Technology

_____ 1. Apply terms and concepts related to air transportation and aerospace technology.

_____ 2. Apply air transportation and aerospace technology in the career cluster areas.

Unit 4: Audio/Video Communications Technology

_____ 1. Apply terms and concepts related to audio/video communications technology.

_____ 2. Apply audio/video communications technology in one of the four career cluster areas.

Unit 5: Biomedical Technology

_____ 1. Apply terms and concepts related to biomedical technology.

_____ 2. Apply biomedical technology in one of the career cluster areas.

Unit 6: Computer Aided Design and Drafting Technology

_____ 1. Apply terms and concepts related to computer aided design and drafting technology.

_____ 2. Apply computer aided design and drafting technology in the career cluster areas.

Unit 7: Computer Imaging Technology

_____ 1. Describe terms and concepts related to computer imaging technology.

_____ 2. Apply computer imaging technology in one of the four occupational cluster areas.

Unit 8: Electrical Technology

_____ 1. Apply terms and concepts related to electrical technology.

_____ 2. Apply electrical technology in one of the four occupational cluster areas.

Unit 9: Engineering Structures Technology

_____ 1. Apply terms and concepts related to engineering structures technology.

_____ 2. Apply engineering structures technology in one of the four career cluster areas.

Unit 10: Environmental Technology

_____ 1. Apply terms and concepts related to environmental technology.

_____ 2. Apply environmental technology in the career cluster areas.

Unit 11: Laser Technology

_____ 1. Apply terms and concepts related to laser and fiber optics technology.

_____ 2. Apply laser and fiber optics technology in one of the four career cluster areas.

Unit 12: Manufacturing Management Technology

_____ 1. Apply terms and concepts related to manufacturing management technology.

_____ 2. Apply manufacturing management technology in the career cluster areas.

Unit 13: Production/Processing Technology

_____ 1. Apply terms and concepts related to production/processing technology.

_____ 2. Apply production/processing technology in the career cluster areas.

Unit 14: Robotics Technology

_____ 1. Describe terms and concepts related to robotics technology.

_____ 2. Apply robotics technology in one of the four career cluster areas.

Unit 15: Satellite Communications Technology

_____ 1. Apply terms and concepts related to satellite communications technology.

_____ 2. Apply satellite communications technology in the career cluster areas.

Unit 16: Emerging Technologies

_____ 1. Research, develop, and present to the class a 5-10 minute presentation, with visuals, on emerging technology related to the career cluster of the student's choice.

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